

# Effects of Focus Ultra 100 EC (Cycloxydim), on Control of Grasses in Sesame Fields

Ayman Abdel Maged Awad<sup>1</sup>, Dafalla Ahmed Dawoud<sup>2</sup>  
Hassan Abdelgadir<sup>3</sup>, Treiza Naeim Bakheit<sup>4</sup>

<sup>1</sup>Gedarif Research Station, Gedarif, Sudan

<sup>2</sup>Gezira Research Station, Wad Medani, Sudan

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**Abstract:** This experiment was conducted, during two seasons 2012/2013 and 2013/2014, at Gedarif Agricultural Research Station Farm under rainfed conditions, to evaluate the efficacy and selectivity of post-emergence application of Focus Ultra 100 EC (Cycloxydim), for grassy weeds control in sesame. The tested herbicide gave excellent control (more than 90%) of grassy weeds, and poor control of broadleaved weeds. Unrestricted weed growth reduced sesame grain yield by up to 75%. Focus ultra at rate of 1, 25 L/fed product, with one supplementary handweeding to the treated plots improved weeds control and increase sesame yield.

**Keywords:** Weeds, Cycloxydim, Unweeded, Broadleaved, Handweeding.

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## I. INTRODUCTION

Sesame, (*sesamun indicum* (L.)), is one of the important oil crop grown in Sudan. It is produced mainly under rainfed conditions (300-800mm) and temperature of >27°C. The crop is tolerant to drought, but not to water logging and excessive rainfall. Sesame is well adapted to a wide range of soils, but requires deep, well-drained, fertile sandy loams. Sudan production was 295250 tones/year obtained from 1404586 hectares, with a mean yield of 210 kg/ha . The crop is highly sensitive to weeds competition, which results in high losses in crop yield. In the rainfed areas, where sesame is cultivated in extended areas, handweeding is very costly and time-consuming job for the farmers. Therefore, chemical weed control is one of the alternatives which can help for weeds control throughout the season. In this experiment Focus Ultra 100 EC (Cycloxydim) is tested, as post-emergence herbicide for grasses control in sesame.

## II. MATERIALS AND METHODS

The experiment was conducted during two consecutive seasons (2012/2013 and 2013/2014), under rainfed condition at the Demonstration farm of the Faculty of Agricultural Science, Gedarif University, in Northern region of the Gedarif State, (Latitude N 14°.33', Longitude E 35°.36', and Elevation 540 m above sea level), the amount of rain less than 450mm, The objective was to assess the activity and selectivity of Focus Ultra 100 EC for grassy weed control in sesame crop. Sesame cultivar "Bromo" was sown on 17<sup>th</sup> July in the first season and on 5<sup>th</sup> August in the second season. The herbicide, Focus Ultra 100 EC (Cycloxydim) is produced by BASF-Germany and introduced to Sudan by CTC Agrochemicals. The chemical applied after 3 week after crop emergence as post-emergence treatment, by using knapsack sprayer at spray volume of 105L/fed. Three doses were tested, 1.00, 1.25 and 1.50 L/fed. Weeded and unweeded control treatments were included for comparison. Weeded treatment plots received three handweedings at biweekly intervals starting after sowing. Some herbicide treated plots received a supplementary handweeding 4 weeks after herbicide application (WAA). Treatments were arranged in randomized complete block design with four replicates. All cultural practices adopted as recommended by Agricultural Research Corporation (ARC) for sesame production under rainfed condition in sudan. Treatments effects on weeds were assessed by counting total and individual weed species and weed ground cover in 4 fixed quadrates (40X25cm) 4 and 8 weeks after herbicide application. Collected data were subjected to analysis of variance.

Duplicate samples (50g each) of sesame seeds were crushed in a mortar. Soxhlet extraction was carried out with 150 ml methanol for 3 hrs. The methanol extract was filtered and evaporated by vacuum rotary evaporator to near dryness. The extracts were cleaned-up by chromatographic column filled with 20 g deactivated Florisil and eluted with 50 ml methanol. The eluate was concentrated to dryness and the residues were taken into 2 ml methanol. Concentrated samples and Cycloxydim standard were spotting in thin –layer chromatography (TLC), on ready- made silica gel GF254 coated plates. The plates were developed in a solvent system of methanol. Residues of Cycloxydim were determined under UV radiation at the wavelength 254 nm.

### III. RESULTS AND DISCUSSION

**Effects on weeds:** The Number of weeds in the unweeded control treatment 4 and 8 weeks after herbicide application (WAA) was 102 and 60 plant / m<sup>2</sup>, respectively. Of the total weed species, 90 to 91% were broadleaved weeds, and the rest were grasses. Dominants weeds were *Corchorus* spp. (43.7 %), *Ocimum basilicum* (13.1%), *Ischaemum afrum* (3.7%), *Sorghum* spp. (3.1%), and *Ophiurus papillosus* (1.9%), in the first season.

In the second season the total number of weeds in the unweeded control treatment was 184 and 174plant/m<sup>2</sup>, 4 and 8 WAA, respectively. Of the total weed species, 54 to 62.5% were broadleaved weeds and the rest were grasses. Dominants weeds were *Corchorus* spp. (22.3 %), *Sorghum* spp. (19%), *Ophiurus papillosus* (12.7%), *Desmodium dichotomum* (9.8%), *Vernonia amygdalina* (7.8%), and *Ischaemum afrum* (7.3%). Dominant weeds and their reactions to different treatments were presented in Tables 1 and 2.

Focus Ultra resulted in (81 to 87%) control of grasses and poor control of broadleaved weeds, early in the first season (Table 3). When the tested product supplemented with handweeding, displayed about 50% control of broadleaved weeds and more than 90% control of grasses. In the second season the herbicide treatments resulted in excellent control of grasses (90 to 100%) and poor control of broadleaved weeds (4.5 to 8.5%), early in the season. When the herbicide treatments supplemented with one handweeding, showed (64 to 73%) control of broadleaved weeds and 100% control of grasses weed. About 90% ground cover reduction was achieved when herbicide treatments were supplemented with one handweeding. Weeds biomass in the unweeded control was 305.7 g/m<sup>2</sup>, and it was 243, 225, and 161.6 g/m<sup>2</sup> in the herbicide treatments, 1.0, 1.25 and 1.5 L/fed, respectively, in the second season. (Table 6)

**Effects on crop:** No visible phytotoxicity symptoms on sesame plants were noticed. Plant population was 71-92 (000) plants / fed and the plant height was 66.55 to 85.5cm. Unrestricted weed growth reduced plant population by 15.8% in the first season. In the second season the plant population was 67.2 to 92.4 (000) plants / fed and the plant height was 59 to 87.4 cm. the reduction in the plant population caused by unrestricted weed growth was 20 %, (Table 5 and 6). The tested products resulted in a variable plant population in comparison to the weeded control treatment, due to competition of broadleaved weeds. Sesame yield in the weeded control treatment was 0.210 and 0.173 t / fed, in the first and second season, respectively, (Tables 5 and 6). Unrestricted weed growth reduced sesame grain yield by 58% and 75% in the first and second season, respectively (table 5 and 6). The herbicide, Focus Ultra With or without supplementary handweeding, improves grassy weeds control and increase sesame yield.

**Residue analysis:** Treated and untreated sesame seeds samples were collected at harvest for residue analysis. The extraction and clean-up of the samples was carried out by standard method, mentioned previously. No residues of the active ingredient Cycloxydim was detected in the sesame samples. The tested product followed by one supplementary handweeding resulted in excellent and persistent control of grasses throughout the two seasons (Tables 3 and 4). Magani, reported that low rates of herbicide treatment, followed by supplementary hoe-weeding reduced weed infestation better than the higher herbicide rates without hoe-weeding, (2008)[1]. The herbicides used showed no visible phytotoxic symptoms on sesame plants. Unrestricted weed growth reduced sesame grain yield by 58% and 75% in the first and second season, respectively. (Tables 6 and 7). Slight weed infestation at the early stages of growth may significantly reduce sesame grain. High weed infestation with monocotyledonous species at the initial stage of crop growth causes decrease in yield by over 20 % (Kaczmarek. *et al*, 2009) [2]. No residues of Cycloxydim were detected in all grain samples tested. Supplementary handweeding should be done 4 weeks after herbicide application, in order to have season long weed control and obtaining an optimum yield of the crop. The use of Focus Ultra as post-emergence treatment for the control of weeds in sesame is safe, if used at the recommended dose.

#### IV. CONCLUSIONS

The herbicide Focus Ultra achieved an excellent control for grassy weeds in the two seasons and had no adverse effects on sesame stand and plant height. Sesame plants are very sensitive to the competition of broadleaved weeds, therefore, the application of the Focus Ultra should be followed by supplementary hand weeding. Focus Ultra 100 EC at dose of 1.25 L/fed plus supplementary handweeding, increase sesame yield compare to the unweeded control and achieved best results among the doses tested. The use of Focus Ultra is safe if used at recommended dosage rate.

#### REFERENCES

- [1] Magani IE. "Weed control in sorghum-groundnut mixture in the simultaneous farming system of Southern Guinea Savanna zone of Nigeria". Journal of Animal 7 Plant Sciences, 1: 3-8. (2008).
- [2] Kaczmarek S, Matysiak K and Krawczyk R. "Studies of the chemical weed control in (*Sorghum vulgare* Perz)". Acta Sci. Pol., Agricultura 8 (1), 27-35. (2009).

#### APPENDIX - A

**Table 1: Effect of Focus Ultra on individual weed species at Gedarif (4WAA), Season 2012/2013**

| % Weed control   |                           |                |                  |                 |              |                    |
|------------------|---------------------------|----------------|------------------|-----------------|--------------|--------------------|
| Treatment        | Herbicides dose (L./fed.) | Corchorus spp. | Ocimum basilicum | Ischaemum afrum | Sorghum spp. | Ophurus papillosus |
| Focus Ultra      | 1.00                      | 0              | 0                | 100             | 95           | 100                |
| Focus Ultra      | 1.25                      | 0              | 0                | 100             | 100          | 100                |
| Focus Ultra      | 1.50                      | 0              | 0                | 100             | 100          | 100                |
| Unweeded control | -                         | 0(44)*         | 0(13)*           | 0(4)*           | 0(3)*        | 0(2)*              |

WAA = Weeks after herbicide application \* Number of individual weed species / m<sup>2</sup>

**Table 2: Effect of Focus Ultra on individual weed species at Gedarif (4WAA), Season 2013/2014**

| % Weed control   |                           |                |              |                    |                      |                 |                     |
|------------------|---------------------------|----------------|--------------|--------------------|----------------------|-----------------|---------------------|
| Treatment        | Herbicides dose (L./fed.) | Corchorus spp. | Sorghum spp. | Ophurus papillosus | Desmodium dichotomum | Ischaemum afrum | Vernonia amygdalina |
| Focus Ultra      | 1.00                      | 0              | 97           | 93                 | 0                    | 95              | 0                   |
| Focus Ultra      | 1.25                      | 0              | 100          | 100                | 0                    | 100             | 0                   |
| Focus Ultra      | 1.50                      | 0              | 100          | 100                | 0                    | 100             | 0                   |
| Unweeded control | -                         | 0(51)*         | 0(30)*       | 0(23)*             | 0(19)*               | 0(12)*          | 0(8)*               |

WAA = Weeks after herbicide application \* Number of individual weed species / m<sup>2</sup>

**Table 3: Efficacy of Focus Ultra on weed control and weed ground cover, season 2012/2013**

| Treatment        | Herbicides<br>dose<br>(L/fed) | Weed control (%) |       |         |     | Weed ground<br>cover (%) |      |
|------------------|-------------------------------|------------------|-------|---------|-----|--------------------------|------|
|                  |                               | Broadleaved      |       | Grasses |     | 4WAA                     | 8WAA |
|                  |                               | 4 WAA<br>WAA     | 8 WAA | 4 WAA   | 8   |                          |      |
| Focus Ultra      | 1.00                          | 0                | 0     | 88      | 90  | 6                        | 5    |
| Focus Ultra +    | 1.00                          | 0                | 55    | 88      | 92  | 6                        | 2    |
| Focus Ultra      | 1.25                          | 0                | 0     | 81      | 95  | 5                        | 5    |
| Focus Ultra +    | 1.25                          | 0                | 52    | 81      | 99  | 5                        | 3    |
| Focus Ultra      | 1.50                          | 0                | 0     | 87      | 90  | 5                        | 8    |
| Focus Ultra +    | 1.50                          | 0                | 39    | 87      | 90  | 5                        | 2    |
| Weeded control   | -                             | 100              | 100   | 100     | 100 | 0                        | 0    |
| Unweeded control | -                             | 0                | 0     | 0       | 0   | 12                       | 8    |
|                  |                               |                  |       |         |     |                          |      |

+ With supplementary hand weeding. WAA= Weeks after application.

**Table 4: Efficacy of Focus Ultra on weed control and weed ground cover, season 2013/2014**

| Treatment        | Herbicides<br>dose<br>(L/fed) | Weed control (%) |       |         |     | Weed ground<br>cover (%) |      |
|------------------|-------------------------------|------------------|-------|---------|-----|--------------------------|------|
|                  |                               | Broadleaved      |       | Grasses |     | 4WAA                     | 8WAA |
|                  |                               | 4 WAA<br>WAA     | 8 WAA | 4 WAA   | 8   |                          |      |
| Focus Ultra      | 1.00                          | 8.5              | 0     | 90      | 90  | 55.4                     | 55.8 |
| Focus Ultra +    | 1.00                          | 8.5              | 69    | 90      | 100 | 55.4                     | 3.5  |
| Focus Ultra      | 1.25                          | 7.5              | 0     | 100     | 95  | 60.7                     | 61.6 |
| Focus Ultra +    | 1.25                          | 7.5              | 64    | 100     | 100 | 60.7                     | 4.6  |
| Focus Ultra      | 1.50                          | 4.5              | 0     | 95      | 95  | 54.8                     | 52.3 |
| Focus Ultra +    | 1.50                          | 4.5              | 73    | 95      | 100 | 54.8                     | 4.6  |
| Weeded control   | -                             | 100              | 100   | 100     | 100 | 0                        | 0    |
| Unweeded control | -                             | 0                | 0     | 0       | 0   | 93                       | 86   |
|                  |                               |                  |       |         |     |                          |      |

+ With supplementary hand weeding. WAA= Weeks after application.

**Table 5: Effects of Focus Ultra on weed biomass, plant population and sesame grain yield, season 2012/2013**

| Treatment     | Herbicides dose<br>(L. / fed.) | Weed biomass<br>(g/m <sup>2</sup> ) | Plant population<br>(000/ fed.) | Plant<br>Height<br>(cm) | Grain yield<br>(t/fed.) |
|---------------|--------------------------------|-------------------------------------|---------------------------------|-------------------------|-------------------------|
| Focus Ultra   | 1.00                           | 94.46 ab                            | 73.5 cd                         | 74.8 b                  | 0.126 bc                |
| Focus Ultra + | 1.00                           | 6.29 b                              | 81.9 bc                         | 73.8 b                  | 0.137 b                 |
| Focus Ultra   | 1.25                           | 82.04 ab                            | 79.8 bcd                        | 66.55 b                 | 0.105 bc                |
| Focus Ultra + | 1.25                           | 5.29 b                              | 72.4 d                          | 71.05 b                 | 0.128 bc                |
| Focus Ultra   | 1.50                           | 82.2 ab                             | 81.9 bc                         | 70.85 b                 | 0.112 bc                |
| Focus Ultra + | 1.50                           | 2.27 b                              | 86.1 ab                         | 75.4 b                  | 0.128 bc                |
| Weeded        | -                              | 0                                   | 93.4 a                          | 85.5 a                  | 0.210 a                 |
| Unweeded      | -                              | 152.7 a                             | 78.7 bcd                        | 68.9 b                  | 0.089 c                 |
| SE ±          |                                | 40.52                               | 8.5                             | 3.33                    | 0.014                   |
| CV %          |                                | 94.33                               | 21.19                           | 9.11                    | 21.82                   |

+ With supplementary hand weeding.

**Table 6: Effects of Focus Ultra on weed biomass, plant population and sesame grain yield, season 2013/2014**

| Treatment     | Herbicides dose<br>(L. / fed.) | Weed biomass<br>(g/m <sup>2</sup> ) | Plant population<br>(000/ fed.) | Plant<br>height<br>(cm) | Grain yield<br>(t/fed.) |
|---------------|--------------------------------|-------------------------------------|---------------------------------|-------------------------|-------------------------|
| Focus Ultra   | 1.00                           | 243.0 ab                            | 71.4 cde                        | 76.1 ab                 | 0.093 bc                |
| Focus Ultra + | 1.00                           | 118.2 c                             | 67.2 c                          | 63.8 bc                 | 0.074 bc                |
| Focus Ultra   | 1.25                           | 225.0 ab                            | 75.6 bcde                       | 59.0 c                  | 0.085 bc                |
| Focus Ultra + | 1.25                           | 95.8 c                              | 70.3 de                         | 75.5 ab                 | 0.105 b                 |
| Focus Ultra   | 1.50                           | 161.6 bc                            | 84.0 bc                         | 73.6 ab                 | 0.094 bc                |
| Focus Ultra + | 1.50                           | 83.21 c                             | 88.0 b                          | 74.0 ab                 | 0.087c                  |
| Weeded        | -                              | 0                                   | 92.4 a                          | 87.4 a                  | 0.173 a                 |
| Unweeded      | -                              | 305.7 a                             | 80.8 bcd                        | 70.7 bc                 | 0.044 c                 |
| SE ±          |                                | 26.7                                | 12.74                           | 11.96                   | 0.017                   |
| CV %          |                                | 21.43                               | 31.46                           | 4.33                    | 36.29                   |

+ With supplementary hand weeding.